Trend Study 16B-16-99

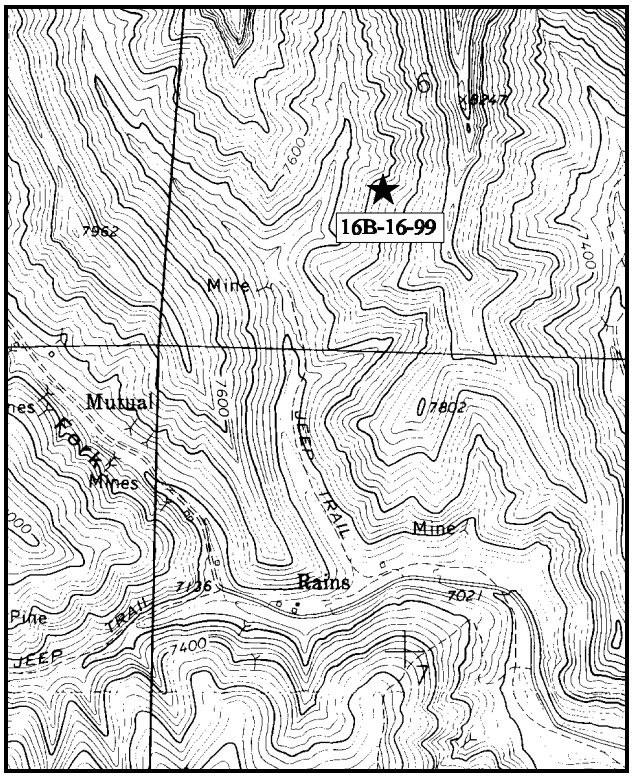
Study site name: Hardscrabble . Range type: Big Sagebrush - Grass .

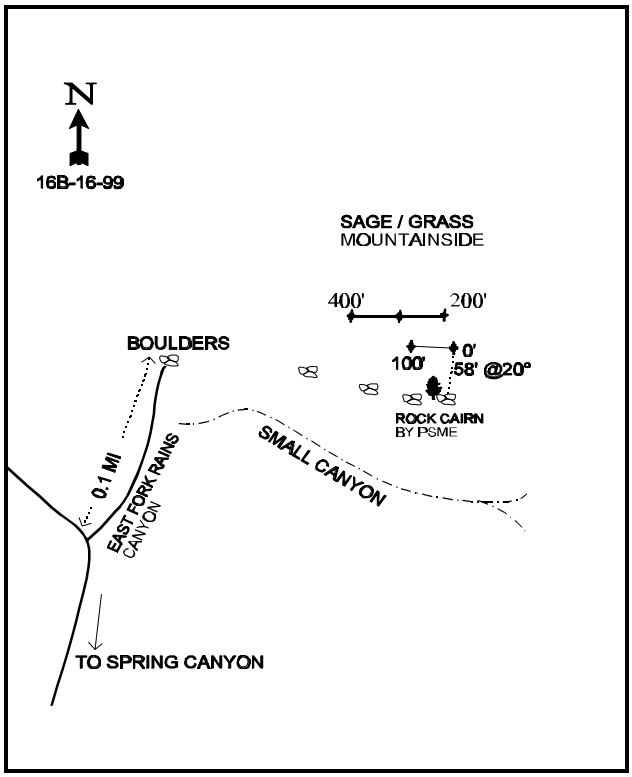
Compass bearing: frequency baseline 270°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34 & 71 ft), line 3 (59ft).

LOCATION DESCRIPTION

From US 6 in Helper, turn west onto North Main St. at the Texaco station. Go straight until you come to Uintah St., then turn left. Continue on to Canyon St., then turn right. Go 1.35 miles to an old R.R. trestle. Continue 2.6 miles to a fork. Stay left on the oiled road and proceed 2.5 miles. Before the concrete bridge in the ghost town of Rains, turn right onto a dirt road by a UP&L substation. Go up Rains Canyon 1 mile to the East Fork. Go up the East Fork of Rains Canyon 0.1 miles to the end of the road. The study is located about halfway up the ridge to the east. Hike up the steep ridge to a rock cairn by a lone Douglas Fir tree. The frequency baseline 0' stake is 58 feet north of the cairn. The 2' tall fencepost has browse tag #7111 attached.





Map Name: Standardville Diagrammatic Sketch

Township 13S , Range 9E , Section 6 UTM 4396522.094 N, 503526.206 E

DISCUSSION

Trend Study No. 16B-16 (30-2)

The grassy ridges and steep side hills in the Hardscrabble area are important winter and spring range for elk. There are scattered blocks of private land in this area administered by the BLM. It is cattle spring-fall range, but livestock use is insignificant on the steep upper slopes. The range type is sagebrush/grass, with Salina wildrye (*Elymus salina*) being the dominant species. The sidehills in this area are all very steep. The study site has a slope of approximately 50%. The north-facing slopes in the area support mountain brush and conifers, while the south slopes are dominated by grasses. Aspect on the study area is to the west with an elevation of 7,600 feet. Pellet group transect data from 1999 indicate a moderate level of use by elk with an estimated 41 elk days use/acre (101 edu/ha). Deer use was light with an estimated 2 deer days use/acre (5 ddu/ha).

Although very rocky, the soil appears to be moderately deep with an estimated effective rooting depth of over 19 inches. The soil textural class is clay loam, with a slightly alkaline pH (7.5). Due to the uniform coverage by bunch grasses, and the prevalence of boulders, cobble and gravel as erosion pavement on the soil surface, the soil is fairly well protected against erosion. On such a steep slope, there will always be some soil movement but it does not appear excessive on this area. Some pedestaling has occurred on the uphill side of the bunch grasses. Phosphorus is low at 3.9 ppm, where 10 ppm has been shown to be necessary for normal plant growth and development. Bare ground makes up only 11% ground cover in 1999, a decrease from 15% in 1994. Litter cover declined from 40% to 21% in 1994 due to drought conditions, but has since increased to nearly 26% in 1999. The increase in litter and decrease in bare ground points to improving soil conditions.

Browse is rather limited on the slope, but is not key as this site does not sample a critical winter browse range. Black sagebrush is the most common species with an estimated density of 5,932 plants/acre in 1988, 5,360 in 1994, and 8,540 plants/acre in 1999. The baseline was lengthened and realigned in 1999 which accounts for most of the large increase in density for black sagebrush over previous readings. Black sagebrush naturally has a somewhat hedged appearance, but half of these shrubs were classified as heavily hedged in 1988. Use in 1994 and 1999 was light to moderate. Percent decadency was high in 1988 and 1994 at 58% and 46% respectively, but has declined to 28% in 1999. Currently, 31% of the decadent plants are classified as dying. However, recruitment is high at 20% and the young age class is sufficient to replace those individuals that are classified as dying. Other species on or near the site include mountain big sagebrush, Greene's rabbitbrush, a shrubby eriogonum, snowberry, and curlleaf mountain mahogany. This is a marginal site for mountain big sagebrush, and none were sampled in 1999 with the realignment of the baseline. Snowberry has also declined and was not found in 1994 or 1999. The curlleaf mahogany in the vicinity is highlined.

Perennial grasses dominate the site with an estimated cover of over 16% in 1994, and nearly 19% in 1999. Salina wildrye, the most abundant grass, is large and vigorous but produces only poor to fair forage. Bluebunch wheatgrass and muttongrass are also very common. Salina wildrye and bluebunch wheatgrass together provide 59% of the total vegetative cover at the site. Forbs are uncommon and relatively unimportant as a forage source on this site. A large *Astragalus* is the most common forb, being sampled in 32% of the quadrats.

1994 TREND ASSESSMENT

Ground cover characteristics have changed due to the drought conditions which have existed over the past few years. Litter cover has declined by nearly 50%, while bare ground has increased by over 50%. However, due to the abundance of herbaceous vegetation, erosion does not appear to be a serious problem. Trend for soil is down slightly due to the reduction of protective ground cover. Trend for browse is stable. Black sagebrush, the key browse species on the site, has a stable population with reduced heavy use, decrease in decadency, and good vigor. Drought conditions have caused a decline in mountain big sagebrush and snowberry, but this

is a marginal site for these shrubs. The site is dominated by grasses. Both bluebunch wheatgrass and Salina wildrye increased significantly in sum of nested frequency while mutton grass declined significantly. Overall, sum of nested frequency for grasses declined slightly. Forbs were never very abundant on the site. Combined, they currently make up less then 1% cover on the site and sum of nested frequency has declined 30%. Trend for herbaceous understory is down slightly.

TREND ASSESSMENT
soil - slightly down
browse - stable
herbaceous understory - slightly down

1999 TREND ASSESSMENT

Trend for soil is slightly up. Erosion is minimal even with the excessive slope. The increase in percent litter cover coupled with the decrease in bare soil cover suggests an improving soil condition. Sum of nested frequency for perennial grasses and forbs increased as well, which indicates better distribution of protective ground cover to hold soils in place. Trend for the key browse, black sagebrush, is up slightly. Percent decadency decreased and recruitment is high. Use is light to moderate with good seed production. The herbaceous understory shows upward trends as the perennial species increased in sum of nested frequency and cover since the 1994 reading.

TREND ASSESSMENT
soil - slightly up
browse - slightly up for black sagebrush, although not critical for this site
herbaceous understory - up

HERBACEOUS TRENDS --
Herd unit 16B, Study no: 16

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'88	'94	'99	'88	'94	'99	'94	'99
G	Agropyron spicatum	151	175	178	63	66	74	5.31	7.04
G	Elymus salina	a198	ab243	b265	76	87	92	10.69	10.61
G	Poa fendleriana	c191	a70	b118	83	32	51	.43	1.21
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		540	488	561	222	185	217	16.45	18.86
Total for Grasses		540	488	561	222	185	217	16.45	18.86
F	Andropogon scoparius	-	1	-	-	1	-	.00	-
F	Arabis spp.	1	2	8	1	1	4	.00	.02
F	Astragalus tenellus	a-	b6	a-	-	5	-	.06	-
F	Astragalus spp.	c128	a2	b71	56	2	32	.03	2.99
F	Castilleja linariaefolia	-	2	-	-	1	-	.00	-
F	Erigeron eatonii	1	-	-	1	-	-	-	-
F	Eriogonum elatum	-	2	-	-	1	-	.00	-
F	Lesquerella spp.	-	-	2	-	-	1	-	.00
F	Machaeranthera grindelioides	8	13	15	4	6	8	.11	.13

Type	Species	Nested Frequency '88	Nested Frequency '94	Nested Frequency '99	Quadrat Frequency '88	Quadrat Frequency '94	Quadrat Frequency '99	Average Cover % '94	Average Cover % '99
F	Phlox longifolia	-	5	-	-	2	-	.01	-
F	Schoencrambe linifolia	a-	b6	ab5	-	4	2	.04	.01
F	Senecio multilobatus	-	4	2	-	2	2	.01	.01
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		138	43	103	62	25	49	0.28	3.17
Total for Forbs		138	43	103	62	25	49	0.28	3.17

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 16B, Study no: 16

Type	Species	Strip Frequency '94	Strip Frequency '99	Average Cover % '94	Average Cover % '99
B	Artemisia frigida	16	22	.01	.07
B	Artemisia nova	87	92	6.14	7.14
B	Artemisia tridentata vaseyana	15	0	.18	-
B	Chrysothamnus depressus	0	2	.00	.03
B	Chrysothamnus viscidiflorus viscidiflorus	7	2	-	-
B	Eriogonum corymbosum	4	4	.00	.15
B	Gutierrezia sarothrae	15	20	.36	.20
B	Juniperus osteosperma	-	-	.63	.15
B	Pinus edulis	0	1	-	.15
B	Symphoricarpos oreophilus	0	0	-	-
Total for Browse		144	143	7.33	7.89

CANOPY COVER --
Herd unit 16B, Study no: 16

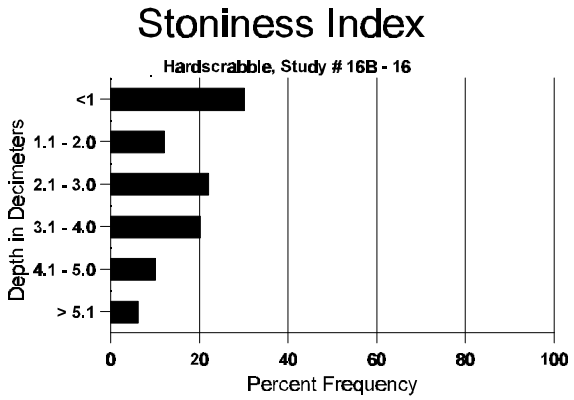
Species	Percent Cover '99
Pinus edulis	1

BASIC COVER --
Herd unit 16B, Study no: 16

Cover Type	Nested Frequency '94	Nested Frequency '99	Average Cover % '88	Average Cover % '94	Average Cover % '99
Vegetation	314	326	14.75	28.01	34.47
Rock	357	313	16.75	26.09	24.68
Pavement	313	309	18.00	3.29	9.48
Litter	372	360	40.25	21.05	25.95
Cryptogams	104	203	2.50	1.75	3.34
Bare Ground	299	271	7.75	15.39	11.73

SOIL ANALYSIS DATA --
Herd Unit 16B, Study # 16, Study Name: Hardscrabble

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
19.3	47.4 (17.7)	7.5	36.0	35.4	28.6	2.7	3.9	112.0	0.7



PELLET GROUP DATA --
Herd unit 16B, Study no: 16

Type	Quadrat Frequency ⁞94	⁞99	Pellet Transect Days Use/Acre (ha) ⁞99
Rabbit	14	1	n/a
Elk	49	55	41 (101)
Deer	7	4	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16B, Study no: 16

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
S	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	99	18	-	-	-	-	-	-	-	-	18	-	-	-	360			18
M	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133	9	3	2
	94	20	-	-	-	-	-	-	-	-	20	-	-	-	400	7	8	20
	99	28	-	-	-	-	-	-	-	-	28	-	-	-	560	7	7	28

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	+53%
'94	00%	00%	00%	+54%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	199	Dec:	-
	'94	420		-
	'99	920		-

Artemisia nova																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	99	23	-	-	3	-	-	-	-	-	26	-	-	-	520			26
Y	88	4	4	1	-	-	-	-	-	-	9	-	-	-	600			9
	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	99	86	-	-	1	-	-	-	-	-	83	4	-	-	1740			87
M	88	7	5	16	-	-	-	-	-	-	28	-	-	-	1866	8	14	28
	94	109	22	-	-	-	-	-	-	-	120	9	2	-	2620	19	21	131
	99	141	61	17	1	-	-	-	-	-	220	-	-	-	4400	6	14	220
D	88	8	16	28	-	-	-	-	-	-	49	-	1	2	3466			52
	94	81	35	-	4	-	-	-	-	-	93	9	9	9	2400			120
	99	59	51	9	1	-	-	-	-	-	83	-	-	37	2400			120
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	900			45
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	1840			92

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	28%	51%	03%	-12%
'94	22%	00%	08%	+39%
'99	26%	06%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	5932	Dec:	58%
	'94	5220		46%
	'99	8540		28%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	88	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	88	6	2	-	-	-	-	-	-	-	8	-	-	-	533			8
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	88	4	2	3	-	-	-	-	-	-	9	-	-	-	600	8	12	9
	94	15	-	-	-	-	-	-	-	-	15	-	-	-	300	7	10	15
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	88	4	1	1	-	-	-	-	-	-	5	-	-	1	400			6
	94	3	-	-	2	-	-	-	-	-	5	-	-	-	100			5
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	22%	17%	04%	-74%
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	1533	Dec:	26%
	'94	400		25%
	'99	0		0%

Chrysothamnus depressus

M	88	1	1	-	-	-	-	-	-	-	2	-	-	-	133	4	13	2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	4	8	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	50%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	133	Dec:	-
	'94	0		-
	'99	60		-

Chrysothamnus viscidiflorus viscidiflorus

M	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200	6	10	10
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	11	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	
'94	00%	00%	00%	-80%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'88	0	Dec:	-
	'94	200		-
	'99	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum corymbosum																		
M	88	-	2	-	-	-	-	-	-	-	2	-	-	-	133	8	16	2
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	11	25	5
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80	11	19	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	100%	00%	00%	-25%
'94	00%	00%	00%	-20%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	133	Dec:		-
'94	100			-
'99	80			-

Gutierrezia sarothrae																		
Y	88	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	88	7	-	-	-	-	-	-	-	-	7	-	-	-	466	10	5	7
	94	28	-	-	-	-	-	-	-	-	28	-	-	-	560	8	9	28
	99	34	-	-	-	-	-	-	-	-	34	-	-	-	680	7	8	34

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	+ 0%
'94	00%	00%	00%	+17%
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	599	Dec:		-
'94	600			-
'99	720			-

Pinus edulis																		
Y	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	0	Dec:		-
'94	0			-
'99	20			-

Symphoricarpos oreophilus																		
M	88	-	1	-	-	-	-	-	-	-	1	-	-	-	66	9	8	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	19	0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'88	100%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'88	66	Dec:		-
'94	0			-
'99	0			-